

Remarks

Claims 11-25, 27-28, and 37-50 are pending in the application. Claims 26 and 29-36 have been canceled. Claims 11 and 28 have been amended. Claims 37-50 have been added. Minor corrections have been made to claims 22, 24, and 25. No new matter has been added by virtue of this amendment. Reconsideration of the application as amended is requested.

Claim Rejections—35 U.S.C. § 102(b)

The Examiner rejects claims 11-14, 19, 20-25 and 27-32 under 35 U.S.C. § 102(b), as being anticipated by Uzawa. Claim 11, as amended, includes the limits of claim 26 which the Examiner said would be allowable if rewritten to include the limits of the base claim. Thus, the rejection of claim 11 and all claims dependent thereon (claims 12-25) has been traversed.

The Examiner states that Uzawa "discloses a system for exposing a substrate 3 (FIG. 3) comprising a stepper and x-ray source 4 (column 26, lines 1-5) with vibration suppression system (see FIG. 85)." However, claim 27 states:

27. A system for exposing a substrate comprising a stepper and an X ray source, vibration insulation there between.

Uzawa's teaching does not concern vibration insulation between stepper and x ray source, it only concerns standard vibration insulation between chamber and base, as described in column 71 and 72. For example on column 71, line 60, Uzawa teaches that "the main chamber 3101 is connected with a vibration suppressing base 8405 at three points." Similarly in column 72 line 40. However, there is no teaching or suggestion to provide vibration insulation between x ray source and chamber or between x ray source and stepper. It was applicants who recognized that the x ray source can provide significant vibration, that this vibration can be transmitted to the stage, and that insulation between source and stepper is needed. Thus, the rejection of claim 27 has been traversed.

The Examiner states, with respect to claim 28, Uzawa discloses a system with a beam transport chamber filled with helium (FIG. 33, column 4, lines 45-50). Claim 28, as amended states:

28. A system for exposing a substrate, comprising a stepper, an X ray source, and a mask, the system further comprising a helium or other low attenuation gas filled beam transport chamber between said X ray source and said mask.

In Uzawa helium is provided between the mask and the wafer. It is not provided between the source and the mask. Uzawa provides the helium for thermal transport. There is no teaching or suggestion to provide helium between the source and the mask. It was applicants who were first to teach providing helium behind the mask in the x-ray beam transport chamber. Thus, the rejection of claim 28 has been traversed.

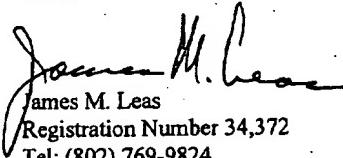
Claim Rejections—35 U.S.C. § 103(a)

The Examiner rejects claims 15-18, and 33-36 under 35 U.S.C. § 103(a), as being unpatentable over Uzawa in view of Huduma. Claims 15-18 depend on claim 11 which has been amended to include the limit of claim 26 which the Examiner said would be allowable. Claims 33-36 have been canceled. Applicant would further note that, as the Examiner points out, Huduma concerns light in the wavelength in the 4 to 30nm range, called EUV or soft X rays. These wavelengths can be reflected as shown in Huduma through large angles. Not so for the X rays of the present invention. Thus, the rejection of claims 15-18 has been traversed.

Applicant has reviewed the prior art made of record and not relied upon and believes that it does not teach or suggest the invention as described in the claims.

It is believed that the claims are in condition for allowance. Therefore, applicant respectfully requests favorable reconsideration. If there are any questions please call applicant's attorney at 802 864-1575.

Respectfully submitted,
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Version with markings to show changes made

Please amend the following claims:

11. (Amended) A method of exposing a resist on a substrate comprising the steps of:
 - a) providing the substrate with a film of resist;
 - b) placing the substrate on a stage; and
 - c) sensing the position of the substrate with a displacement sensor, wherein
said displacement sensor comprises a differential variable reluctance transducer (DVRT).
22. The method as recited in claim 21, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that position of said mask with respect to said substrate is optimum.
24. The method as recited in claim 19, further comprising the step of using said displacement sensor output to control mask to wafer misalignment.
25. The method as recited in claim 11, further comprising the step of using said displacement sensor output to control substrate x, y, z, rotation, and magnification.

28. (Amended) A system for exposing a substrate, comprising a stepper, [and] an X ray source, and a mask, [said stepper] the system further comprising a helium or other low attenuation gas filled beam transport chamber between said X ray source and said mask.